Technical Paper 333

LEVEL II

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DEVELOPMENT OF RESOURCE MANAGEMENT MATERIALS FOR THE G2 AIR OFFICER

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and

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BATTLEFIELD INFORMATION SYSTEMS TECHNICAL AREA

U. S. Army

Research Institute for the Behavioral and Social Sciences

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The Surveillance Systems Work Unit Area of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) has been analyzing the Army's aerial surveillance and reconnaissance (AS&R) system, particularly with respect to the G2 Air officer position. A major conclusion of a study of the job requirements for G2 Air and image interpretation personnel (ARI Research Report 1181) stressed the need to direct more attention to the training of the G2 Air officer. This present effort concentrated on developing resource

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management materials for the G2 Air officer that could be used for on-the-job training and guidance in the performance of duties and in intelligence school courses.

Resource management materials were compiled in the form of a handbook to achieve the training objectives. The first step involved gathering information on tasks as performed by operational AS&R units, preparing a comprehensive study data base, and conducting field observations and interviews to verify the data base. Next, a content outline of the handbook was prepared by integrating the field interview data with the existing data base. Knowledgeable personnel reviewed this outline. Third, preparation of the handbook itself took into account the various training techniques and aids appropriate for on-the-job and school application. Step four consisted of conducting a limited evaluation of the handbook to determine its usefulness, acceptance, and final structure. Next, a 'preliminary edition' of the handbook used the information derived from the evaluation. Finally, an automated demonstration of a portion of the handbook illustrated how the materials could be used with possible future computerized information systems.

1473B

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BATTLEFIELD INFORMATION SYSTEMS TECHNICAL AREA

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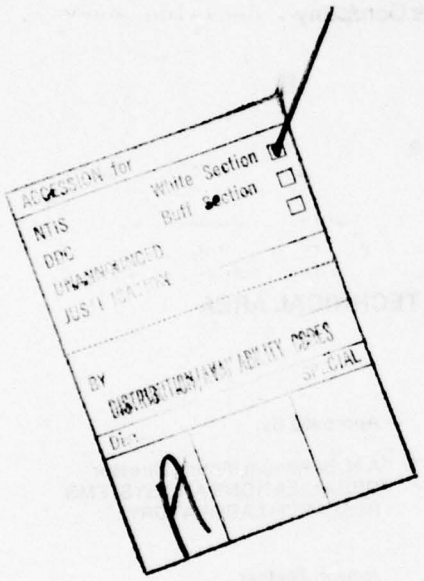

FOREWORD

The Battlefield Information Systems Technical Area is concerned with the human resource demands of increasingly complex battlefield systems that are used to acquire, transmit, process, disseminate, and use information. This increased complexity places greater demands on the operator using the machine system. Research in this area focuses on human performance problems related to interactions within command and control centers, as well as issues of system development. The research is concerned with such areas as software development, topographic products and procedures, tactical symbology, user-oriented systems, information management, staff operations and procedures, decision support, and sensor systems integration and use.

An area of special concern is the efficient, effective use of surveillance and reconnaissance resources. The continued proliferation of information-collecting equipment coupled with rapid technological change and the demands of modern warfare have dramatically increased the complexity of the surveillance and reconnaissance system. To ensure use of these assets in a way responsive to command needs requires skilled and knowledgeable users and collection managers. The tactical commander must understand the capabilities and limitations of the surveillance and reconnaissance system. In addition, the collection manager must understand user needs and procedures for planning, coordinating, and managing these assets. Previous research by the Army Research Institute (ARI), reported in Research Report 1181, identified significant deficiencies in the ability of the G2 Air officer (now the Surveillance and Reconnaissance Officer) to effectively plan and manage aerial surveillance and reconnaissance resources.

This report concerns the development of a handbook for the G2 Air officer: "The Aerial Surveillance and Reconnaissance MANAGER." This handbook has demonstrated its effectiveness in U.S. Army units and schools located worldwide (ARI Research Memorandum 75-14). The report was not published at the time the handbook was distributed to user organizations because of the urgency of other requirements. Continued interest in and requests for copies of the handbook have led to the publication of its development. Although some changes have occurred in terminology and doctrine since the research was conducted, the functions involved remain largely unchanged.

Research in the area of sensor systems integration and use is conducted as an in-house effort augmented by contracts with organizations selected for their specialized capabilities and unique facilities. The present research was conducted in conjunction with personnel from the McDonnell Douglas Corporation (now McDonnell Douglas Astronautics Company) under the program direction of Dr. Abraham H. Birnbaum. Research

in this area is responsive to general requirements of Army Project 2Q162106A721 and to special requirements of the U.S. Army Assistant Chief of Staff for Intelligence.

JOSEPH ZEIDNER
Technical Director

DEVELOPMENT OF RESOURCE MANAGEMENT MATERIALS FOR THE G2 AIR OFFICER

BRIEF

Requirement:

To prepare materials to aid the G2 Air officer in the performance of management duties and to conduct limited field testing to determine their usefulness, acceptance, and final structure.

Procedure:

Information was gathered on tasks performed by operational aerial surveillance and reconnaissance (AS&R) units. From this, a comprehensive study data base was created and verified by field observations and interviews. A content outline for a handbook was prepared by integrating the field interview data with the existing data base. This outline was reviewed by knowledgeable personnel. The handbook was then prepared, taking into account the various training techniques and aids that are appropriate for on-the-job and school application. The handbook went through a limited evaluation to determine its usefulness, acceptance, and final structure. The handbook was revised, using the information derived from the evaluation. Part of the materials were then programed for use in an automated demonstration.

Findings:

A usable set of materials, in the form of a handbook, was developed to aid G2 Air officers in performing management duties.

Handbook features, such as a functional task inventory, decision analyses for preplanned and immediate missions, a section on management guidelines, and indexes for functional tasks and key words, were found to be acceptable and usable in a limited evaluation of the materials.

Demonstration efforts indicate that the materials can be programed for use in an automated system that will permit the use of indexing schemes, the seeking of information at various task levels, the presentation of graphic or pictorial information, the integration of data base materials with other communication channels, and the updating of the data base.

Utilization of Findings:

The handbook is used by instructors in the U.S. Army Intelligence Center and School, Aerial Surveillance and Reconnaissance (AS&R) Division, for lesson planning and practical exercises.

Various operational units have also received copies of the handbook for use and evaluation.

A more extensive validation of the handbook is planned, the outcome of which will further determine how the materials are to be used.

DEVELOPMENT OF RESOURCE MANAGEMENT MATERIALS FOR THE G2 AIR OFFICER

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DEVELOPMENT OF RESOURCE MANAGEMENT MATERIALS FOR THE G2 AIR OFFICER

BACKGROUND

G2 Air officers have enjoyed only limited recognition for the job they do for the field commander. Several reasons for this were identified in a previous research effort[1] which established G2 Air officer and image interpreter job requirements. Among the reasons identified were: (a) formal training given to aerial surveillance officers may not prepare them adequately for the G2 Air officer job of asset manager, (b) acceptance of the G2 Air officer by tactical commanders was limited, and (c) officers were inappropriately assigned into G2 Air officer slots. The study suggested several means of alleviating the situation. The present effort focuses on creating and implementing more appropriate G2 Air officer training. At this point, there is no specific training for an officer assigned to the position of G2 Air officer from the current image interpreter officer position. The G2 officer must, and typically does, rely on on-the-job training to become acquainted with this position.

The previous effort specified those tasks within the G2 Air officer job that are of primary importance and for which training should be enhanced. Those areas of instruction that were considered most important for the G2 Air officer were the G2 Air functions and duties, G2 Air duty teams, map reading, intelligence collection and production, and exploitation of airborne sensors. More specific areas that were labeled as requiring increased training emphasis included aerial surveillance and target acquisition, image interpretation reports, camouflage principles, insurgency practical exercises, knowledge of information management, and principles of visual observation. Thus, the G2 Air officer role is mainly one of management of resources in the performance of surveillance functions. In addition, the G2 Air officer must have knowledge of other areas of intelligence to insure the integration of surveillance and reconnaissance into the overall intelligence picture.

Training specific to the details of day-to-day duties was needed. Because there is no current course (nor time allocated for it) that will give the G2 Air officer the appropriate training, research and development was undertaken to produce materials to provide the necessary guidance and instruction.

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[1] Youngling, E. W., Vecchiotti, R. A., Bedarf, E. W., & Root, R. T. Job Requirements of G2 Air and Image Interpretation Personnel. ARI Research Report 1181, May 1974. (AD 780 815)

OBJECTIVE

The purpose of the current effort was to produce materials that the G2 Air officer can use for on-the-job training and guidance in the performance of duties and in intelligence school courses. This dual purpose warranted the development of a flexible document that could be used in either a classroom or field environment.

The specific objectives of this effort were:

1. To prepare materials to aid the G2 Air officer in the performance of management duties.

2. To conduct limited field testing with the materials to determine their usefulness, acceptance, and final structure.

DEVELOPMENTAL PROCEDURES

Phases of the Research Effort

This research effort was carried out in six major phases:

1. Detailed information on tasks performed by operational aerial surveillance and reconnaissance (AS&R) units was gathered. This was accomplished by preparing a comprehensive study data base and by conducting field interviews to verify the resource data base.

2. A content outline of a handbook that would provide aids to the G2 Air officer in the performance of management duties was prepared. Field interview data were integrated with the existing data base to improve the applicability of the data base. Knowledgeable personnel then reviewed the outline.

3. The handbook was prepared, taking into account the various training techniques and aids that are appropriate for on-the-job and school application.

4. A limited evaluation of the handbook was conducted to determine its usefulness, acceptance, and final structure. This was done by using both instructors and students in the aerial surveillance field. The evaluation consisted of performance testing and the use of a questionnaire and interviews to determine the format acceptance and the accuracy and completeness of the materials.

5. A preliminary edition of the handbook was prepared using the information derived from the evaluation.

6. An automated demonstration of a portion of the handbook was prepared to illustrate how the materials could be used with possible future computerized information systems.

Data Base

Management materials for the G2 Air officer were developed by applying systems analysis techniques in an iterative process over the duration of the effort. The initial phase of development required the review and collection of detailed information on tasks performed by operational AS&R units. This phase included review of 152 technical documents and training materials, and interviews of operational G2 Air officers at Fort Bragg, N.C., and Fort Huachuca, Ariz.

The framework for the information collected was the Army air intelligence system. Verification was sought from the operational environment for the flow diagrams prepared in the earlier study and expanded in the present effort. In general, emphasis in the system analysis was placed on the integration of substantive materials concerned with the functions of the various AS&R subsystems and key personnel as found in field manuals, formal training course materials, and field aids. Of specific interest were the day-to-day activities of the G2 Air officer and the unique context in which they were performed.

The expanded analyses focused on management tasks and decisions. The management task analysis was designed to identify and categorize the major management tasks of the G2 Air officer in performing the duties of an asset manager. The analysis described specific behavior listed as decisions/actions, as well as the information required to carry out each behavior. Each of these behaviors was related specifically to the flow diagrams of the operational environment in which the G2 Air officer performed the job. The analysis provided a realistic framework from which to interpret the major management tasks and prepare a content outline of resource management materials.

The expanded task analysis and preliminary decision analysis focused on management duties. Decisions were subsequently analyzed in greater detail as described in Table 1.

This listing of management tasks and decisions of the G2 Air officer was shown, for comment and correction, to 27 senior G2 Air officers in stateside units and the Intelligence School. The project team was encouraged by the fact that no major revisions were suggested. The majority of officers felt the task list was complete, realistic, and accurate. The expanded flow diagrams were also reviewed. These diagrams described the relationship of the G2 to the different G2 branches, the flow of requests from the requester to the appropriate collection unit, and certain G2 Air management functions. In each case, the diagramed management operation or situation was a step-by-step

procedure that terminated in definite actions, decisions, responsibilities, or information products. The analysis could be described as a complete situation analysis. Again, only minor revisions were suggested from the field.

Table 1

Major Tasks and Decisions of the G2 Air Officer

Tasks	Decisions
Participate in surveillance and reconnaissance planning meetings	Determine acceptability and correctness of request
Advise G2 officer and G2 staff on surveillance and reconnaissance	Determine whether request can be satisfied by enemy situation (ENSIT) file
Consolidate preplanned requests	Check master cover trace
Process immediate requests	Determine whether additional missions are required
Evaluate enemy air defense	Determine priorities
Coordinate with G3 Air officer, airspace control element, and fire support element	Select best sensor
Coordinate with collection agencies	Approve mission
Integrate with G2 collection plans	Cancel and reschedule requests
Supervise image interpretation/ AS&R collection capability	
Perform G2 Air officer supervisory duties	
Generate indicators to be obtained by AS&R overall effort	

The expanded decisions, shown in Table 1, deserve special note as they were incorporated directly into the final management aid to complement the task index. As a management aid, listing major decisions was thought to be insufficient for use in an operational setting. A

more detailed decision analysis was required and was conducted simultaneously with the task analysis.

The purpose of the decision analysis was to identify the decision processes and information requirements of G2 Air officers as they make the eight major decisions outlined in the flow diagrams. This set of decisions dealt almost exclusively with the functions of processing information requests and mission planning. Based on this, the decision analysis dealt with the decision processes of the G2 Air officer for both preplanned and immediate missions, examined from the receipt of the information request to its final disposition.

A binary decision tree was used in analyzing these processes so that all logical alternatives would be considered. The analysis stressed completion of the requests whenever possible, considering the use of all potential resources available. In addition to the basic decision flow, the information/actions required to get data relevant to the decisions and other tasks were derived. Both information input and output were identified, specifying information needed by the G2 Air officer, information generated by the G2 Air officer for other service elements, and recordkeeping functions. This process resulted in a description of the G2 Air officer's decision flow and the information environment in which the officer operates. Figure 1 is a sample decision analysis. This type of binary decision analysis (all decisions structured as yes-no choices) was derived from a computer-type logic tree (described later) and can be converted directly into a computerized flow with the required information/action associated with each choice point.

This basic decision analysis was expanded to include personnel resources for each subelement with respect to both G2 Air staff and other involved parties. The information/actions were analyzed, and information resources were outlined with respect to specific data sources for technical data (charts and specific information), general and procedural information (field and technical manuals), and areas where additions and improvements were required. This total analysis served as a working document to define the specific job aids and review material to be included in the final resource management and procedures document. Further refinements identified specific content areas that needed emphasis and developed or derived appropriate techniques for providing the required information.

The technique for the decision flow was derived from a binary logic tree similar to that used in diagraming computer programs. The basic principle is simple, although the trees themselves can become quite complex. The system to be analyzed is listed task by task, and all decisions are identified. Each decision is structured to yield a "yes" or "no" response, with each response leading to a different course of action and theoretically to a different outcome. If this occurred in practice, a tree consisting of only 10 decisions could have 2^{10}, or 1,024, possible outcomes. Fortunately, most trees were found to be

MISSION SEGMENT: PREPLANNED MISSION

7. Cancel or Reschedule Requests

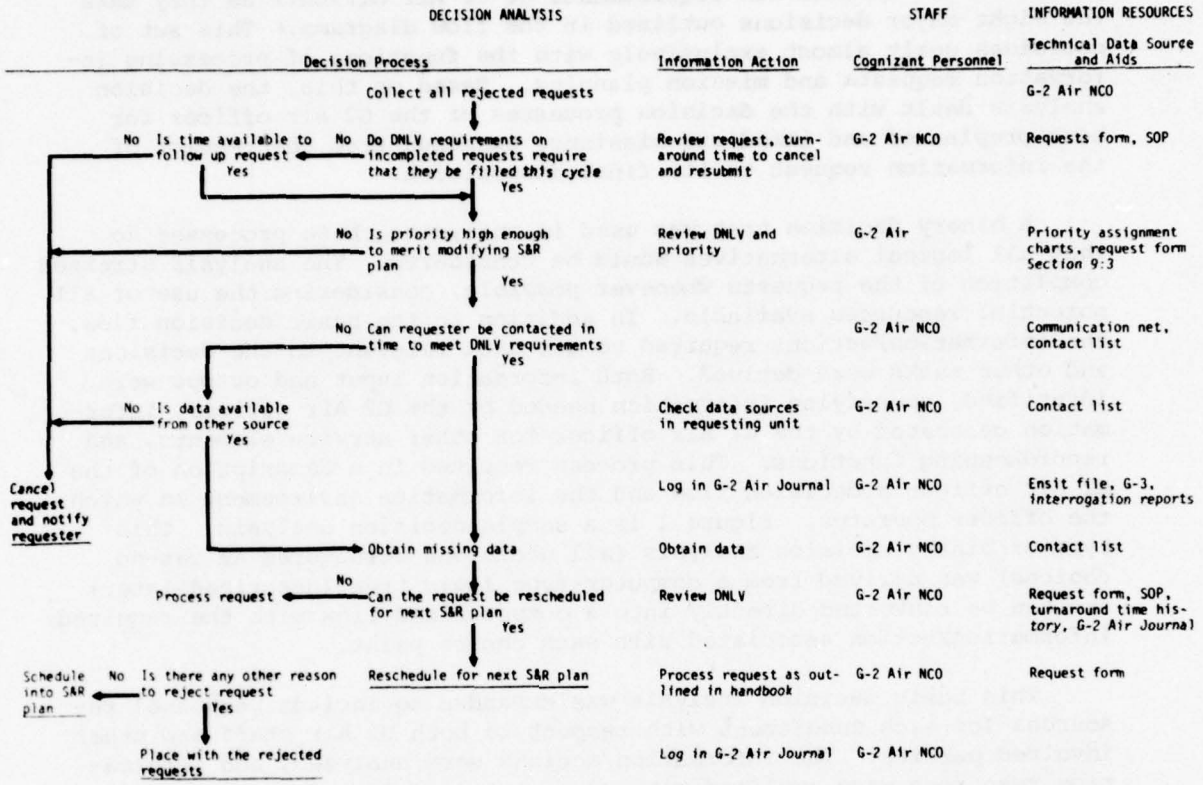

Figure 1. Sample decision analysis.

convergent, and a "no" decision leads to either a corrective action and then a return to the main stream of effort, or a termination of effort stopping that particular branch after one or two decisions. The pattern or structure of this decision flow is for the "yes" responses to define the major path, with the "no" responses relating to the absence of resources or blockages to reaching the goal. More effort or activity is generally required after a "no" response than a "yes" response at a decision point. Like a computer program, the analysis covered all possible actions or paths and all possible outcomes as the G2 Air officer goes through the task of processing an information request.

The detailed structure of the tasks required of the G2 Air officer was obtained largely from Field Manual (FM) 30-5, FM 30-20, and the flow diagrams from the previous effort, "Establishment of G2 Air Officer and Image Interpreter Job Requirements" (Youngling et al., 1974). The tasks were outlined and a decision flow was derived from a logical analysis of the alternatives available to the G2 Air officer for fulfilling the requirements specific to each task. The decisions were analyzed and information requirements for making a proper decision were identified. The decision analysis was, therefore, tied directly to the major documented sources of procedures for filling requests. Further validation by field personnel added to the accuracy, completeness, and realism of this effort.

The analysis provided a detailed breakdown of the type of subject matter the G2 Air officer must make decisions about in task units approximating management functions. Decisions that were previously analyzed individually were grouped as multidecision tasks, and similar tasks were grouped under more complex decision statements. The analysis was used to identify specific information areas to be considered for inclusion as resource management aids. The result of this effort was incorporated into the management materials as a major section and was cross-referenced to the functional task index for easy use.

The accumulated information resulting from the task and decision analysis formed a data base from which a content outline was developed. The outline contained information the G2 Air officer needed to successfully perform his role as asset manager.

Content Outline and Indexing

Preparation of a preliminary content outline began with the identification of the information requirements of the G2 Air officer as part of the expanded task analysis. A matrix format was used to identify relevant documentation of each item in the content outline. For efficient use of the prepared management materials, the content outline followed the task sequence identified in the task analysis. The outline was iterated several times by the project team and operational officers. The final management materials, with the outline incorporated,

were prepared as the functional task index (see Appendix A). The preliminary outline was reviewed by the Army Research Institute (ARI) prior to the development of materials.

Because the management materials were to be computer compatible, information retrieval schemes were integrated with the materials being developed. These schemes were designed to allow the user or G2 Air officer access to the materials needed to perform management duties by providing a strategy for the categorization and retrieval of specific items needed for a situation.

The indexing of the material followed the natural divisions of the G2 Air officer's job as determined by system analysis. Twelve major tasks were separated into the three functions of preparation, collection, and administration around which related materials were grouped. This grouping resulted in a task index that was job-oriented. To facilitate location of material concerning certain words and phrases, a key word index was generated and included at the end of the document. This index allowed the G2 Air officer to locate material concerning his job when limited information such as a key word or phrase was available.

To further equip and assist the G2 Air officer, guidelines on management duties were included because the analysis of the job showed that G2 Air officers managed assets in collection of intelligence data. The material consisted of management techniques that were derived and refined in other applications but could be applied to any management problem. The techniques were grouped according to one of the following functions: assemble resources, plan, organize, direct, and control. The functions were cross-referenced to the task index in the final document.

The resulting document contained a detailed description of the G2 Air officer's job, the reference material to assist in making decisions, and the contacts needed to accomplish the job. For reference use, the document was indexed so that only the material needed for a specific decision/action was located within the context in which it would be carried out.

OVERVIEW OF THE MANAGEMENT MATERIALS

The materials prepared were assembled into a document called "Aerial Surveillance and Reconnaissance MANAGER (Management Aids and Guidelines for Evaluating Resources)."[2] The document consists of three major sections. The first section includes the detailed functional task index, which lists the 12 major management duties of the G2 Air officer and the tasks and subtasks associated with each duty. Under each task, substantive materials were included that specify procedures,

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[2]Available from the Army Research Institute.

information sources, and key contact personnel relative to the activities that must be performed to successfully carry out the major task. The functional task index provides an outline of the materials included in this section. Overviews are included as a part of each task section. The overviews present, in capsule or pictorial form, the essentials of each section as a quick reference. Figure 2 is a sample overview. The overviews were enclosed in plastic sleeves, which can serve as a writing surface. At the end of each task section, there is a checklist to encourage a self-check that appropriate steps were taken. Another feature is the flexibility to place checklists and overviews into one sleeve, which could be removed from the body of the document for use as a handy reference at planning meetings and briefings.

The next major section of management materials was the final version of the decision analysis. Overall, the decision analysis identified a number of critical areas where the G2 Air officer must make decisions concerning the capability and allocation of assets, the relative priorities of missions, and the location of information resources. Techniques for simplifying these decisions were identified. In developing the analysis, consideration was given to decision task difficulty with a goal of using aids to reduce all decisions as near to a simple binary type as possible.

The analysis was divided into decisions for processing preplanned and immediate mission requests. These decisions required few, if any, aids as they are shown in the handbook. Of the decisions, 25% were of the more complex evaluative type, requiring the selection of a correct solution from several alternatives. By providing aids that defined alternatives and decision rules, however, it was possible to reduce these decisions to a series of binary-type decisions. Decision points were also cross-referenced to the management task sections.

Another section was a compilation of management guidelines divided into the classical listing of management functions: assemble resources, plan, direct, organize, and control. This section included general management principles applicable to subtasks listed under the major management task index. The major tasks were cross-referenced to the specific management function under which they belonged. Key factors to help the user tailor the guidelines to his unique circumstances were included where appropriate.

The three sections--tasks, decisions, and management guidelines--of the handbook were interrelated by cross-references when appropriate. For greater ease of retrieving information, several indexing schemes were incorporated as part of the handbook. The first scheme was a listing of major management tasks and subtasks with page references. The task sequence represented a logical flow of events so that a user would appreciate the context in which the task occurred and know which tasks preceded and followed the particular task. The functional task index permitted the matching of functional titles to the relevant information and procedures needed to carry out the task.

OVERVIEW SECTION 2
BASELINE SURVEILLANCE & RECONNAISSANCE CAPABILITY

THIS FIGURE SHOWS AN OVERVIEW OF THE S&R RESOURCES TYPICALLY AVAILABLE TO THE COMMANDER. TYPICALLY, THE G-2 AIR OFFICER TASKS THE PERSONNEL IDENTIFIED IN COLUME 1 TO COLLECT INFORMATION REQUIRED TO SATISFY THE COMMANDERS NEEDS.

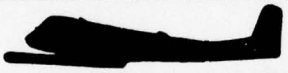
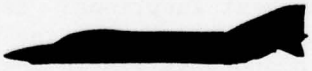
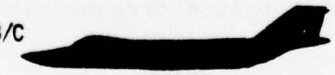
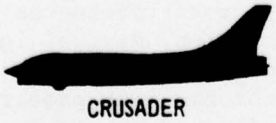
Contact	Resources	Capability	DAY / NIGHT
(1) Division Aviation Officer	AH-16  HELICOPTER, ATTACK (HUEY COBRA); OH-6A  HELICOPTER, LIGHT OBSERVATION (CAYUSE) UH-1B/H  HELICOPTER UTILITY/CARGO(IROQUOIS) Organic to Army at Division Level	VISUAL AS&R AIRBORNE PERSONNEL DETECTORS HAND HELD CAMERA	D D/N D
(2) G-2 Air Corps (MICAS)	OV - 1B  OV-1C/D  Sensor Aircraft (Mohawk) YO-3A  Obervation Aircraft Organic to Army at Corps/FA Level	VISUAL AS&R PHOTOGRAPHIC SENSOR IR SENSOR SLR SENSOR	D D D/N D/N
(3) G-2 Air Corps (TAC Reconnaissance Support)	RF-4-B/C  PHANTOM RF-101 B/C  VOODOO RF-8 A/G  CRUSADER Typical Tactical Sensor Aircraft Provided by Air Force, Navy or Marines	VISUAL AS&R PHOTOGRAPHIC SENSOR IR SENSOR SLR SENSOR (POSSIBLE OTHER EXOTIC SENSOR)	D D/N D/N D/N

Figure 2. Sample overview.

A second indexing system was included so the user could follow the steps used in decisionmaking. This index was closely related to the functional task index and is essentially the end result of the decision analysis. The index was based on logical alternatives through the generation of binary logic trees. The decision index can be used independently of the task index.

A key word index was also included with the materials. This index listed key words, some key phrases, and all acronyms used in the materials. It was designed for individuals not familiar with acronyms or who needed information about a specific term. The pages referenced for each item were selected because of their explanatory content relative to the specific term.

An index of lesser importance helped users seeking information specifically related to management functions. The user could refer to the management guidelines where, after reviewing factors included under each classical management function, he is then referred to the major management task representative of each management function in the overview for that section. Thus, the user can immediately tailor the factors in the management section to specific day-to-day task actions.

The four indexes to the materials allow the user to find information as quickly as possible. Each scheme reduced the chances for confusion and frustration because the user could easily switch to the most appropriate index scheme for his current needs.

The structure of the materials also made allowances for possible computerization. The logical development, binary decision trees, and indexing schemes were prepared with a view toward automation. The compatibility between the materials and computers allows for the flexibility to accommodate changes and revisions. Because the intelligence system involves constantly changing situations, the materials must be amenable to adjustment so as to be more useful and responsive to current requirements.

EVALUATION OF THE MATERIALS

A limited evaluation of "AS&R MANAGER" was conducted at Fort Huachuca, Ariz., by McDonnell Douglas Corporation (MDC) and ARI personnel. The evaluation was limited, and more extensive field testing and review was planned outside the scope of this effort. The present evaluation was conducted to provide a vehicle for making changes to the document, based on the use of the materials by a small number of personnel who were subsequently asked to evaluate the usefulness and acceptance of the materials.

Subjects

Subjects were students and instructors from the AS&R Division of the U.S. Army Intelligence Center and School. Students were members of a class in course 3A-9309. The course qualifies officers for Military Occupational Specialty (MOS) 9309, aerial surveillance officer. This particular class was unusual for a basic course because it was comprised of officers with over 4 years of experience on the average. Several captains in the class had prior experience as intelligence specialists.

There were 11 students in the sample. Students were divided into two groups: Group A had five students and Group B had six. Both groups were matched in terms of experience, with Group A averaging 4 years and Group B averaging 4.5 years. Several students possessed MOS from combat arms schools.

There were 15 instructors in the evaluation sample. Instructors were officers or senior sergeants. There were nine commissioned officers, one warrant officer, and five noncommissioned officers in the sample. The average experience level for all instructors was 9.8 years of total service.

Data Collection Materials

To cover as wide a range of evaluation processes as possible, evaluation materials included biographic information sheets for students and instructors, a series of objective tests, four scenarios with questions, rating sheets, comment sheets, and recordings of individual and group discussion sessions.

The biographic information sheets were taken from the G2 Air questionnaire used previously (Youngling et al., 1974). Specific items covered were MOS, length of service, formal training, military assignments, civilian education, and name, rank, and branch. These sheets were given to students and instructors and served as background information against which responses were evaluated in relation to other data collection items.

Objective test questions for the students were prepared by MDC personnel and put into a question pool. Each test consisted of a group of short-answer, fill-in, and multiple-choice questions. The study design required equivalent test forms, which were assembled by matching questions from the pool in terms of content area and difficulty. Matching was accomplished by using MDC intelligence specialists to judge the difficulty level of each question. The project staff assured that answers to questions, especially for Session I, were in the field manuals. Further, the project staff assured that questions covered a wide content area of both the field manuals and handbook. Answers were located within a few pages in either the field manuals or handbook.

Four scenarios were prepared of comparable content and difficulty. Each included a statement of a situation that could confront a G2 Air officer. All relevant factors were given in the statement. Each student was required to answer questions about the situation. A "school solution" was prepared, and each student's score was the number of items of the school solution included in his answer. Time measures of the total time spent answering the objective test questions and scenario items were taken.

Both students and instructors were asked to fill out evaluative rating sheets and comment sheets. The rating sheets were used to evaluate user acceptance and judgments of the usefulness of materials measured by attitude scales developed specifically for this effort. These scales consisted of a series of positive and negative statements relating to the content of "AS&R MANAGER." For the acceptability scale, the participants rated statements of opinion on a 4-point scale ranging from "not at all" to "very much so." These statements related to personal feelings concerning the document. The usability scale presented statements concerning the "AS&R MANAGER" in terms of ease of use, format, and technical accuracy, which were rated on a 5-point scale ranging from "strongly agree" to "strongly disagree."

Statements for both of these scales were developed in positive and negative forms for each subject area investigated. One question from each of these pairs was assigned randomly to one of the two alternative equivalent forms of the evaluation tests. This procedure was used to control evaluator biases and to serve as a built-in response reliability measure. The procedure also yielded two equivalent test forms for use in Sessions II and III of the evaluation procedure.

Comment questions were prepared as a structured interview and covered such areas as indexing systems, technical accuracy, uses of the handbook, writing style, completeness, and format. Each interview session (with the participant's permission) was recorded. Transcriptions were made of all taped interviews. Essentially the same areas were covered in the interviews as in the evaluation sheets, but interviewees were allowed more open-ended responses and expansion of ideas drawn from their unique experiences.

Procedure

Student and instructor groups were given separate, brief orientations to the research that led to the handbook. The purposes of the evaluation and the role of the participants were presented. Instructors were asked to review the handbook in detail, write on the blank pages in the handbook, and fill in the evaluation sheets. Individual interviews were conducted to assure that key areas of interest were covered in the evaluation. Interviews were scheduled with instructors during the several days after the briefing. Eight instructors found time to

read the entire document. Seven others read at least the body of the document (task inventory and 12 task sections). All communicated their comments and impressions about the handbook, and five were able to fill in the overall rating sheets in the time allotted. Others focused on detailed comments in the more open-ended portions of the evaluation sheets and communicated their overall impressions in the interviews.

Three student evaluation sessions were held. During Session I students were given the first set of objective questions and scenarios. Alternate forms were used for Groups A and B. Group A answered each question without the aid of Field Manuals 30-20, 30-5, and Technical Manual 30-245. Group B was allowed to search through these manuals. In Sessions II and III, there were no differences in procedure for the two groups.

For Session II, which took place on the same day as Session I, both groups were given a 10-minute briefing on the indexing systems in the handbook. This briefing was followed by a 20-minute review of the content of each indexing system focusing on the task inventory. Each student was given the same amount of time to review the indexes. Following the review, the second set of objective questions and scenarios was given to each group. Rating sheets were also given to measure initial impressions of acceptability and usefulness of the handbook. Finally, each student was asked to compare the confidence in answers given in Session I with answers given in Session II.

Session III followed a more thorough review of the handbook. Students kept the handbooks overnight. Upon their return the next morning, students were given the last set of objective questions, scenarios, and evaluation forms. Evaluation forms were extensive and covered indexing systems, task sections, management duties, decision analysis, and overall ratings of the acceptability and usefulness of the handbook. An overview of the student evaluation study is shown in Table 2.

Results

The results of the performance testing of students is shown in Tables 3 and 4. Table 3 shows the student performance on the objective tests for each session. For each session the two groups scored equally well on the objective tests, as indicated by the Mann-Whitney U Test ($\alpha > .05$ in all cases). The time taken by each group to complete the test was significantly different for Session I (Mann-Whitney U Test $\alpha < .01$) but not for the other two sessions ($\alpha > .05$). A comparison of the session-to-session scores for each group revealed a trend toward higher performance scores with more exposure to the handbook (Friedman Two-Way Analysis of Variance: Group A, $p = .042$; Group B, $p = .0055$).

Table 2

Overview of Student Evaluation Study

Session	Group A	Group B
I	No manuals	FM 30-20, 30-5, and TM 30-245
	Objective questions	Objective questions
	Scenarios 3 and 4	Scenarios 1 and 2
II	Brief 30-minute review of handbook indexes	Brief 30-minute review of handbook indexes
	Objective questions	Objective questions
	Scenario 1	Scenario 3
III	More detailed review of handbook	More detailed review of handbook
	Objective questions	Objective questions
	Scenario 2	Scenario 4

Table 3

Student Performance Summary for Objective Tests

Session	Group A (n = 5) Mean % correct	Group A (n = 5) Mean time (min.)	Group B (n = 6) Mean % correct	Group B (n = 6) Mean time (min.)
I Baseline	43.9	15.4	38.5	37.0
II Index only	64.5	26.0[a]	75.3	20.4[a]
III Greater use	79.8[a]	19.8[a]	81.1	21.8

[a]Number of subjects in group was four.

Table 4

Student Performance Summary for Scenario Tests

Session	Group A (n = 5) Mean items correct	Group B (n = 6) Mean items correct
I Baseline	7.4 6.2	5.8 7.7
II Index only	10.2[a]	7.7[b]
III Greater use	16.2[a]	9.5

[a]Number of subjects in group was four.

[b]Number of subjects in group was 5.

The results of the objective tests seem to indicate that use of the handbook enhances performance on the objective tests and that there is no advantage to having prior (baseline) use of other manuals. The evaluation was limited and did not, therefore, include sufficient controls to determine whether more exposure to test taking could have accounted for the increase in performance on subsequent tests.

The performance on the scenario tests is more difficult to assess. The scores that were given for each scenario reflected the number of elements included in the answer that contributed to a successful approach to solving the problem ("school" solution). Table 3 indicates the mean items that are correct for each group in each session. Overall, there appears to be an increase in correct items as a function of exposure to the handbook.

Confidence levels rose with increased involvement with the handbook. There was no apparent difference in confidence between groups. Confidence was measured after Sessions II and III. Each student was asked whether the confidence he had in the answers increased, decreased, or remained the same when compared to the previous session. They expressed no decreases in confidence; all individuals who reported this information indicated their confidence increased or remained the same.

Students, in general, tended to respond positively to acceptability and usefulness-type items on the "overall" rating sheets. This response held true for initial ratings made after a brief exposure to the handbook as well as for the final "overall" ratings. Ratings for Session III tended to be slightly higher than for Session II. These ratings are presented in Appendix B.

Rating sheets for instructors are also found in Appendix B. Here, too, responses were positive in terms of the acceptability and usefulness of the instructor's overall impressions of the handbook. A sample of comments made about the handbook by the instructors follows:

"As an aid to the [on-the-job training] OJT of G2 Air personnel, 'AS&R MANAGER' could be broken down into a programed instruction type of training."

"In my view, the manual was outstanding in that you bring everything in one place, in one book that's got to do with G2 Air, and it's terrific."

"It would be an invaluable asset to a fellow coming into a G2 Air post for the first time."

"I know one thing about the structure of it; it's kind of a bit wordy and that tends to scare people off, particularly a person wanting to read all the words."

"I personally like the style it was written in and I like the detail that it went into in a specific--as you say in the book here--real world type thing; most other FM's that I've read kind of hedge around, actually, who in fact is supposed to coordinate with whom. In fact you get very, very specific."

"This document is invaluable in setting up the G2 Air workshop...."

Discussion

The results of the rating scales clearly show that both students and instructors definitely felt the handbook was acceptable and useful as an aid to the G2 Air officer. Several comments that focused on a few minor technical inaccuracies and additions were considered in the final revision.

The performance of students on the objective tests and scenarios shows some interesting changes. The improvement in performance between sessions is of special interest because it occurs after only a brief exposure to the indexing systems. Additional improvement is observed after some familiarity with the handbook. In Session I, the use and nonuse of manuals did not seem to affect performance dramatically. The time difference associated with the use of field manuals is explained by the amount of time required to search for an answer. The nonmanual group would simply move to the next question if the answer to a previous question was not apparent from memory.

Other time differences tended to virtually disappear by the third session, with both groups showing little difference in test performance and time. Assuming adequate measuring instruments, the two groups became more homogeneous as a result of using the handbook. It should be noted that the time includes only that portion during the evaluation procedure and not time spent with the indexing systems or the 24-hour familiarization.

It was concluded that the handbook was acceptable to a sample of potential users. Furthermore, the handbook accounted substantially for the observed improvement of students and the increased confidence they placed in their responses. Its usefulness was also apparent. In addition to its primary use, several secondary uses were mentioned during the evaluation. These uses were

1. As a supplementary reference during formal training,

2. For G3 training,

3. For G2 and G2 staff training,

4. As a workbook and take-home supplement to formal training,

5. As a checklist for G2 Air officers,

6. For OJT within intelligence,

7. For G2 Air staff OJT, and

8. For combat officer training.

DEMONSTRATION OF AUTOMATED VERSION

Demonstration Plan

The increased planning for and use of automated information systems prompted the thought that the AS&R system might one day be linked to a computerized information center. Indeed, the previous effort (Youngling et al., 1974) took automation into account when forecasts were made concerning the abilities and skills that would be required of AS&R personnel in the future. It was the intention of this demonstration to take the existing materials, in manual form, and convert a portion of them for use in ARI's Training and Information Systems Facility (TISF). This was done to provide information about the flexibility of the handbook in serving as input for a more sophisticated data base.

It was believed that the information in the manual, as well as serving an educational purpose on the job or in the classroom, could be integrated with other data to form an interactive data base for G2 Air personnel. Although the feasibility of this was not approached directly, some of the elements of the demonstration were seen as important first steps in eventually determining such feasibility. The demonstration was, therefore, meant to be illustrative and not comprehensive.

The objectives of the demonstration were

1. To illustrate the functional task indexing scheme of the materials.

2. To permit the user to seek information at various task levels.

3. To illustrate the use of visual presentations with text.

4. To integrate the use of the data base with other communication channels.

5. To illustrate the capability of updating the data base.

Hardware

The basic TISF hardware used in the demonstration consisted of a CDC 3300 computer, a cathode ray tube (CRT), an IBM 1050 station, and special viewing devices. Attached to the IBM 1050 station were a typewriter, an IBM 1092 keyboard, a random access slide projector, and a rear projection viewer.[3]

When the system is in operation, the subject receives basic instructions via the CRT and selects what he desires to view in the data base via the keyboard. The slide projector and rear projection viewer complement the CRT by presenting graphic and pictorial information. The typewriter serves to present simulated information from the field.

Structure of the Demonstration

The material prepared for the automated demonstration contains general instructions that can be presented on the CRT frame by frame. The subject is instructed to press the send button to proceed at the end of each frame. Once beyond the general instructions, which include an assignment, the subject is given the option of selecting what data base material he wishes to see.

The initial frame of the data base is depicted in Figure 3. From this frame the subject can select further data on preparation, collection, or administration functions. The lower portion of the frame instructs the subject how the options may be selected. If the subject selects "preparation," for example, another frame (see Figure 4) appears indicating the set of tasks under "preparation." The subject then elects to see more information under one of the preparation tasks or can return to the function list or the previous frame (the latter two being the same in this case). The subject can, thus, progress to the subtask, specific topic, and individual data element levels as indicated in Figures 5, 6, 7, and 8. In each case, the subject can return to the function list and start over on another search through the hierarchical index or return to the previous frame to make a minor change in search strategy.

Accompanying some of the frames are slides that are automatically presented on a rear projection screen. These slides bear complementary information, such as pictures and fixed specifications of the various resources.

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[3]Commercial designations are given only in the interest of precision of reporting. Their use does not constitute indorsement by the U.S. Army Research Institute or the U.S. Army.

```
DATA ON THE FOLLOWING G2 AIR OFFICER FUNCTIONS ARE AVAILABLE:
 (1)  PREPARATION
 (2)  COLLECTION
 (3)  ADMINISTRATION

(-)  ENTER NUMBER OF ABOVE CATEGORY DESIRED AND PRESS SEND
     BUTTON.
```

Figure 3. Frame depicting function level information.

```
DATA ON THE FOLLOWING PREPARATION TASKS ARE AVAILABLE:
 (1)  IMAGE INTERPRETER/AERIAL SURVEILLANCE AND RECONNAISSANCE
      COLLECTION CAPABILITY
 (2)  EVALUATE S+R BASELINE CAPABILITY
 (3)  COORDINATE WITH COLLECTION AGENCIES
 (4)  COORDINATE WITH G3/AIRSPACE (ACE)/ARTILLERY (FSE) CONTROL
 (5)  GENERATE INDICATORS TO BE OBTAINED BY S+R REPORT
 (6)  EVALUATE ENEMY AIR DEFENSE

 (-)  ENTER NUMBER OF ABOVE CATEGORY DESIRED, OR ENTER LETTER
      OF ONE OF THE FOLLOWING OPTIONS, AND PRESS SEND BUTTON.

      A.  RETURN TO FUNCTION LIST
      B.  RETURN TO PREVIOUS FRAME
```

Figure 4. Example of frame depicting task level information.

```
DATA ON THE FOLLOWING SUBTASKS UNDER THE TASK *EVALUATE S+R
BASELINE CAPABILITY* ARE AVAILABLE:
 (1)  AERIAL SURVEILLANCE AND RECONNAISSANCE RESOURCES
 (2)  ESTABLISH SENSOR COLLECTION CAPABILITY
 (3)  ESTABLISH IMAGE INTERPRETATION CAPABILITY BY ECHELON
 (4)  ESTABLISH GROUND SENSOR COLLECTION CAPABILITY
 (5)  ESTABLISH S+R CAPABILITY FOR SPECIAL STUDIES

(-)  ENTER NUMBER OF ABOVE CATEGORY DESIRED, OR ENTER LETTER
     OF ONE OF THE FOLLOWING OPTIONS, AND PRESS SEND BUTTON.

     A.  RETURN TO FUNCTION LIST
     B.  RETURN TO PREVIOUS FRAME
```

Figure 5. Example of frame depicting subtask level information.

```
DATA ON THE FOLLOWING SPECIFIC TOPICS UNDER THE SUBTASK
*ESTABLISH SENSOR COLLECTION CAPABILITY* ARE AVAILABLE:
ESTABLISH DATA COLLECTION CAPABILITY OF:
 (1) PHOTOGRAPHIC SENSORS
 (2) IR SENSORS
 (3) SLAR SENSORS
 (4) OTHER SENSORS
 (5) ESTABLISH TOTAL AIRBORNE SENSOR DATA COLLECTION
     CAPABILITY

(-)  ENTER NUMBER OF ABOVE CATEGORY DESIRED, OR ENTER LETTER
     OF ONE OF THE FOLLOWING OPTIONS, AND PRESS SEND BUTTON.

     A.  RETURN TO FUNCTION LIST
     B.  RETURN TO PREVIOUS FRAME
```

Figure 6. Example of frame depicting specific topic level information.

```
**SEE SLIDE FOR DATA ON PHOTOGRAPHIC SENSORS**

DATA ON ASSOCIATED AIRCRAFT UNDER THE SPECIFIC TOPIC
*PHOTOGRAPHIC SENSORS* ARE AVAILABLE BY ECHELON:
 (1)  DIVISION
 (2)  CORPS
 (3)  OTHER SERVICES SUPPORT

(-)  ENTER NUMBER OF ABOVE CATEGORY DESIRED, OR ENTER LETTER
     OF ONE OF THE FOLLOWING OPTIONS, AND PRESS SEND BUTTON.

     A.  RETURN TO FUNCTION LIST
     B.  RETURN TO PREVIOUS FRAME
```

Figure 7. Example of frame depicting data element level information.

```
**SEE SLIDE FOR DATA ON AIRCRAFT**

RESOURCES AVAILABILITY - DIVISION

-----AIRCRAFT-----          TO+E          OPERATIONAL

OH-6A (CAYUSE)               34               30

AH-1G (HUEY COBRA)           15               14

UH-1B/H (IROQUOIS)           39               37

(-)  ENTER LETTER OF ONE OF THE FOLLOWING OPTIONS, UPDATE
     RESOURCES AVAILABILITY ABOVE IF "X" OPTION CHOSEN, AND
     PRESS SEND BUTTON.

     A.  RETURN TO FUNCTION LIST
     B.  RETURN TO PREVIOUS FRAME
     X.  UPDATE RESOURCES AVAILABILITY
```

Figure 8. Example of frame depicting data element level information.

Some of the frames that are presented can be updated (see Figure 8). Information coming in on the typewriter can simulate messages indicating changes in the status of available resources. These changes can be entered in the data base by selecting the "X" option, typing the new information over the old, and pressing the send button. Future reference to that frame will then bear the updated information.

For the purposes of this limited demonstration, the entire handbook is not included in the automated version. Thus, only a sample of the individual data elements is included. If the subject seeks data elements that are not programed, he receives the message depicted in Figure 9.

All of the objectives of the automated demonstration were met. It must be remembered that to implement fully such a system, i.e., to include all the data elements in an automated data base, would entail a great deal of effort and would present many additional problems. This demonstration serves to indicate what approach and format is possible when considering such a system.

CONCLUSIONS

The present effort has produced the following products and results:

1. A handbook, "Aerial Surveillance and Reconnaissance MANAGER," was prepared for on-the-job and school application, with the aid of existing Army manuals and input from the field. The major sections of the handbook include a functional task inventory, decision analyses for preplanned and immediate missions, a section on management guidelines, and indexes for functional tasks and key words.

2. This handbook has undergone a limited evaluation by instructors and students at the Division of the U.S. Army Intelligence Center and School. The results have encouraged use of the handbook at the school and in the field.

3. An automated demonstration of portions of the handbook has been prepared to illustrate possible future use of the materials under computer control.

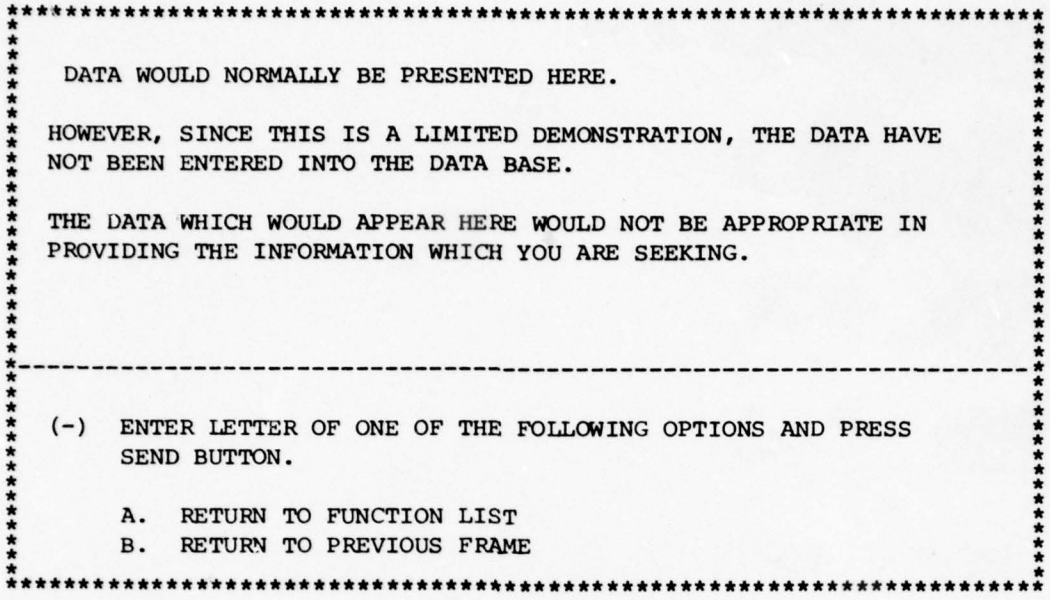

Figure 9. Frame indicating absence of data in data base.

APPENDIX A

FUNCTIONAL TASK INDEX

Tasks

I. Preparation Function (Sections 1 through 6)
   1. Identify Image Interpreter/Aerial Surveillance and Reconnaissance System
      1:1 Identify II/AS&R Assets
         Imagery Interpretation Capability
         AS&R Capability
         Supporting Forces
         Ground Sensor Capability
      1:2 Establish Supervisory Channels
         II Contact Points
         AS&R Contact Points
         Ground Sensor Contact Points
      1:3 II/AS&R Supervisory Requirements
         II Supervision Tasks
         AS&R Supervision Tasks
      1:4 Establish Procedures for Information Exchange with Other Branch Chiefs
         G2 Branch Contact Points
         Establish Coordination Meetings
      1:5 Define G2 Air Direction Responsibility
         II Direction
         AS&R Direction
         Ground Surveillance and Reconnaissance (S&R)
   2. Evaluate S&R Baseline Capability
      2:1 AS&R Resources
         Division Helicopters
         Aircraft at Corps
         Tactical S&R Support from Other Sources
         Consolidated AS&R Aircraft Type List
      2:2 Establish Sensor Collection Capability
         Establish Data Collection Capability of Photographic Sensors
         Establish Data Collection Capability of Infrared Sensors
         Establish Data Collection Capability of SLR Sensors
         Establish Data Collection Capability of Other Sensors
         Establish Total Airborne Sensor Data Collection Capability
      2:3 Establish Image Interpretation Capability by Echelon
      2:4 Establish Ground Sensor Collection Capability
         Visual S&R Capabilities of Observation Posts and Forward Observers

Establish S&R Capability of the Armored Cavalry Squadron Ground Radar S&R Capabilities
Establish Electronic S&R Capability (Unattended Ground Sensors and Army Security Agency)
Establish Total Ground Sensor Collection Capability

2:5 Establish S&R Capability for Special Studies

3. Coordinate and Communicate with Collection Agencies and Requesters

3:1 Establish Communication Interface Points with S&R Units

3:2 Develop Collection Communication SOP

3:3 Establish Communication Channels

Verify G2 Air Communication SOP with S&R Units
Establish Feedback Point to G2 Air
Establish Periodic Communication Channel Verification
Update G2 Air Communication SOP as Necessary

3:4 Communications for Dissemination

4. Coordinate with G3 Airspace (ACE), Artillery (FSE) Control

4:1 Establish Coordination Channels

Establish Aviation Officer Interface Point and Responsibility
Determine Interface Point with ACE and ACE Area of Airspace Control
Establish Mission Lead Time Requirements
Establish FSE Interface Point and Coordination Channels, Area of Responsibility for Support Fires and Request Lead Time

4:2 Establishment of Mission Priorities

Determine Mission Request/Threat Area Value to Establish AS&R Priority Scale
Coordinate with G3 Operations
Determine Mission Request/Airspace Request Value to Establish AS&R Priority Scale (Mission Request Priority, Airspace)
Coordinate with ACE
Determine Mission Request/Fire Support Value to Establish AS&R Priority Scale (Mission Request Priority, Fire Support)
Coordinate with FSE
Establish Integrated Mission Request Priority Scale (Mission Request Priority)
Coordinate Mission Request Priority Scale with G3/ACE/FSE

4:3 Establish G3/ACE/FSE Coordination Procedures

Integrate Coordination and Priority Procedures into SOP for Processing Mission Requests (Mission Request Priority SOP)
Coordinate and Finalize SOP for Processing Mission Request with G3/ACE/FSE (G3/ACE/TOC Coordination SOP)
Submit Mission Request Processing SOP to G2 for Approval

Issue Mission Request Processing SOP to G2 Section Branches and G3/ACE/FSE

5. Generate Target Features To Be Obtained by S&R Effort
   - 5:1 Determine What Information Is Required to Answer G2 Essential Element of Information (EEI) and Other Information Requirement (OIR)
     - Evaluate EEI's and OIR's
   - 5:2 Determine What Features Will Provide Required Information
     - Determine Which Features Are Associated with Specific Items of Information
     - Determine Which Features Can Be Recorded by Sensors
     - Determine Required Features
   - 5:3 Formulate S&R Collection Effort Requirements
     - Select Features That Can Be Recorded by Organic S&R Capability
     - Select Features That Can Be Recorded by Support S&R Capability
     - Select Features/Sensors That Will Yield Most Data Under Tactical Operating Conditions
6. Evaluate Enemy Air Defense
   - 6:1 Define Order of Battle (OB) in Area of Interest
   - 6:2 Determine Enemy Antiaircraft Artillery (AAA) Capability for AS&R Area of Interest
   - 6:3 Determine Enemy Airborne Defense Capability
   - 6:4 Determine Total Enemy Air Defense
   - 6:5 Determine Threat Values for S&R Missions
   - 6:6 Establish S&R Threat Value Review Cycle

II. Collection Function (Sections 7 through 11)

7. Participate in S&R Planning Meeting
   - 7:1 Determine Enemy Air Defense Capability
     - Review Enemy OB
     - Review Enemy Table of Organization and Equipment (TO&E) for AAA and Aircraft Units
     - Evaluate Enemy Air Defense Capability
   - 7:2 Evaluate Terrain Within Area of Responsibility
     - Analyze Map Coverage of Area
     - Analyze Basic Coverage (Imagery) of Area
     - Evaluation of Terrain Analysis
   - 7:3 Establish Weather Probability for Area of Responsibility
     - Review Regional, Seasonal Weather History
     - Review Long-Range Weather Forecast
     - Review Immediate Area of Concern Short-Term Weather Forecast Reports
     - Analyze Weather Review and Forecast
   - 7:4 Establish Current AS&R Resources
     - Determine Organic Aircraft (A/C) Resources (Visual AS&R)
     - Determine Dedicated A/C Resources
     - Determine AS&R Sensor Resources
     - Consolidate AS&R Resources

7:5 Establish Current Ground S&R Resources
Determine Organic Ground Sensor Assets
Determine Organic Ground S&R Sensor Status
Determine Ground Sensor Data Acquisition Capability
Establish Ground Sensor Assets Capability
7:6 Evaluate Air/Ground Integrated S&R Capability
Specify Areas Where Air/Ground S&R Can Be Accomplished
7:7 Evaluate AS&R Workload
Review Unfilled Information/Mission Requests Backlog
Estimate Information/Mission Requests for Current Cycle
Estimate S&R Assets Requirements to Fill Requests
7:8 Final Preparation for Planning Meeting--Information Needs
Review Backlog and SOP Requirements
Review Available Assets
Consolidate S&R Information Requirements and Assets
7:9 Participate in Development of G2 Collection Plan
New Requirements from G2 and Other Branch Chiefs
Consolidate Preplan/Assets and New Requirements
Develop S&R Portion of Collection Plan

8. Develop Integrated Collection Plan
8:1 Analyze G2 Collection Plan
8:2 Analyze Overall G2 Air Collection Capability
8:3 Evaluate G2 Air Capability to Participate in G2 Collection Plan
8:4 Determine if Participation in G2 Collection Plan Conforms to G2 Air SOP
8:5 Determine G2 Air Information Requirements
8:6 Consolidate Information Requirements
8:7 Task Appropriate Collection Units

9. Develop AS&R Preplanned Collection Effort
9:1 Determine if Request Conforms to SOP
9:2 Determine if Request Can Be Filled from Existing Information
9:3 Establish Mission Request Priority
9:4 Determine Resources Available
9:5 Consolidate Preplanned Requests into Mission by Priority
9:6 Execute Mission Plan
9:7 Perform Necessary Coordination to Support Mission

10. Process Immediate Request
10:1 Determine if Request Can Be Acted Upon at This Level
10:2 Determine if Request Can Be Filled from Existing Data
10:3 Determine if Request Can Be Filled by Organic Resources
10:4 Process Request and Notify Requester
10:5 Perform Necessary Coordination to Support Mission

11. Advise G2 and G2 Staff on S&R
11:1 Identify G2/Staff Information Needs
11:2 Inform G2/Branch Chiefs of S&R Resources
11:3 Integrate Resource Utilization into S&R SOP

III. Administration Function (Section 12)

12. Perform G2 Air Officer Supervisory Duties

- 12:1 Prepare and/or Update SOP when Necessary
- 12:2 Prepare Organization Charts
- 12:3 Prepare Reference Material
  - Author-Title-Source
  - Subject Cross-Reference System
- 12:4 Perform Liaison with Other Echelons
- 12:5 Prepare Reports and Correspondence
- 12:6 Requisition Materials
- 12:7 Prepare and Maintain G2 Air Journal
- 12:8 Update Priority Assignment Cycle when Necessary
- 12:9 Prepare Personnel Qualification and Information Summary
- 12:10 Evaluate Performance of G2 Air Personnel
- 12:11 Counsel G2 Air Personnel
- 12:12 Supervise On-the-Job Training
- 12:13 Establish Work Procedures
- 12:14 Organize Special Work Teams
- 12:15 Manpower Forecasting

APPENDIX B

STUDENT AND INSTRUCTOR EVALUATION RATING SHEETS AND SUMMARIES

Student Rating Sheet Summary
Form A
Usefulness of "AS&R MANAGER"

Legend: 1 - Strongly agree
2 - Agree
3 - Not sure
4 - Disagree
5 - Strongly disagree

	Average Rating			
	II		III	
	A	B	A	B
1. It would take more time to use this handbook than the time it might save.	3.7	3.3	4.5	4.0
2. The multiple indexes were difficult to understand and use.	3.7	3.3	3.5	4.0
3. Needed a more general treatment of the G2 Air job. Too much emphasis on specific tasks.	4.3	3.7	4.0	4.5
4. The handbook concentrated on too much trivia. Many items are just commonsense and could be left out.	4.3	3.3	3.5	4.5
5. This handbook would be of use as a supplement to the formal school.	1.7	2.0	3.0	1.5
6. This handbook would be a valuable source of material for on-the-job training.	2.3	2.0	2.5	1.5
7. This material is not really relevant to the G2 Air officer's real duties.	4.0	4.0	5.0	4.5
8. Using this handbook would not increase the effectiveness of the G2 Air officer.	4.3	3.7	4.0	4.0
9. Needed more examples of overall situations and the way to handle them to be of real use.	2.7	2.7	3.0	3.5

		Average Rating			
		II		III	
		A	B	A	B
10.	The material was a waste of time. All the stuff is covered in other handbooks.	4.0	4.0	4.0	4.5
11.	More information could be obtained from the handbook if it were written in a standard military form.	3.3	4.0	3.0	4.0
12.	This handbook would be used very seldom in a field situation.	4.3	3.7	5.0	4.0

Student Rating Sheet Summary
Form A
Acceptance of "AS&R MANAGER"

Legend: 1 - Not at all
2 - Somewhat
3 - Moderately so
4 - Very much so

	Average Rating			
	II		III	
	A	B	A	B
1. I would like a copy of this handbook if I were ever assigned as a G2 Air officer.	3.7	3.7	3.0	4.0
2. Following the work outline in the handbook, I would not have time to effectively do the actual work required.	2.0	1.7	2.0	1.5
3. I felt organization of the handbook was logical and easy to understand.	2.7	2.7	3.5	2.5
4. I found it difficult to follow the table of contents.	2.0	1.3	3.5	2.0
5. I found the writing style boring and repetitious.	1.3	1.7	2.5	2.5
6. I thought that many of the most important G2 Air jobs were left out.	2.0	1.7	1.0	2.0
7. I think the personal touch of addressing the G2 Air directly was good.	1.7	2.3	3.0	2.5
8. After reading this book I still don't know what the G2 Air officer really does.	2.0	1.0	2.5	1.0
9. I feel the emphasis on information not found in other handbooks is a good thing.	2.7	3.3	2.5	3.5

Student Rating Sheet Summary
Form B
Usefulness of "AS&R MANAGER"

Legend: 1 - Strongly agree
2 - Agree
3 - Not sure
4 - Disagree
5 - Strongly disagree

	Average Rating			
	II		III	
	A	B	A	B
1. On-the-job training is too complex to be helped by the use of this handbook.	4.5	3.7	4.0	4.3
2. The handbook would increase the G2 Air officer's capability to meet severe timeliness requirements.	2.0	2.7	2.7	2.5
3. The task-by-task breakdown would be very helpful as a reference in doing the G2 Air's job.	2.5	2.3	2.7	2.0
4. *This handbook would be very useful to* have in the field.	1.5	2.0	2.3	2.0
5. The level of detail was small enough to be of real assistance in performing the G2 Air officer's job.	2.5	2.3	2.7	2.3
6. This handbook would increase the efficiency with which the G2 Air officer does his job.	1.5	2.0	2.3	2.0
7. The multiple indexing made it very easy to find a specific piece of information.	4.0	2.7	3.0	2.5
8. The material covered can give new insight into the complexities of the G2 Air officer's job.	2.0	2.0	2.0	2.0
9. This document would be useful in fulfilling the G2 Air officer's job.	2.0	2.0	2.3	2.0
10. The material in the handbook does not lend itself to use in the formal course of instruction.	4.0	4.3	3.7	4.0

	Average Rating			
	II		III	
	A	B	A	B
11. Enough specific information was given so that more examples were not needed.	4.0	3.0	2.7	3.0
12. The absence of the usual military-handbook-style made the handbook a more effective job aid.	3.5	2.0	3.3	3.0

Student Rating Sheet Summary
Form B
Acceptance of "AS&R MANAGER"

Legend: 1 - Not at all
2 - Somewhat
3 - Moderately
4 - Very much so

	Average Rating			
	II		III	
	A	B	A	B
1. I got a good appreciation of the things the handbook covered from the table of contents.	2.5	2.3	2.0	3.5
2. I think that the handbook has given me a greater understanding of the G2 Air officer's responsibilities.	3.5	3.0	2.7	1.8
3. I felt the indexing system was overly complex.	2.0	1.7	2.3	1.3
4. I felt content needs to be presented in a more formal fashion.	3.0	1.3	1.7	1.8
5. I think organization of the handbook was confusing; too many ways of saying the same thing.	2.0	1.7	2.0	1.3
6. I felt that the coverage of the G2 Air's job was very thorough.	3.5	2.7	2.3	2.8
7. I think this handbook would increase my effectiveness as a G2 Air officer.	4.0	3.7	3.3	3.0
8. I don't think enough stress was placed on intelligence doctrine and material from other military handbooks.	2.5	2.0	1.3	2.5
9. The informal style of writing held my interest.	2.0	2.3	2.3	2.0

Instructor Rating Sheet Summary
Form A
Usefulness of "AS&R MANAGER"

Legend: 1 - Strongly agree
2 - Agree
3 - Not sure
4 - Disagree
5 - Strongly disagree

		Average Rating
1.	It would take more time to use this handbook than the time it might save.	3.6
2.	The multiple indexes were difficult to understand and use.	3.4
3.	Needed a more general treatment of the G2 Air job. Too much emphasis on specific tasks.	4.4
4.	The handbook concentrated on too much trivia. Many items are just commonsense and could be left out.	4.4
5.	This handbook would be of use as a supplement to the formal school.	1.6
6.	This handbook would be a valuable source of material for on-the-job training.	2.4
7.	This material is not really relevant to the G2 Air officer's real duties.	4.0
8.	Using this handbook would not increase the effectiveness of the G2 Air officer.	4.0
9.	Needed more examples of overall situations and the way to handle them to be of real use.	3.8
10.	The material was a waste of time. All the stuff is covered in other handbooks.	4.2
11.	More information could be obtained from the handbook if it were written in a standard military form.	4.2
12.	This handbook would be used very seldom in a field situation.	3.8

Instructor Rating Sheet Summary
Form A
Acceptance of "AS&R MANAGER"

Legend: 1 - Not at all
2 - Somewhat
3 - Moderately so
4 - Very much so

		Average Rating
1.	I would like a copy of this handbook if I were ever assigned as a G2 Air officer.	3.6
2.	Following the work outline in the handbook, I would not have time to effectively do the actual work required.	2.4
3.	I felt organization of the handbook was logical and easy to understand.	3.0
4.	I found it difficult to follow the table of contents.	1.0
5.	I found the writing style boring and repetitious.	1.4
6.	I thought that many of the most important G2 Air jobs were left out.	1.8
7.	I think the personal touch of addressing the G2 Air directly was good.	3.2
8.	After reading this book I still don't know what the G2 Air officer really does.	1.0
9.	I feel the emphasis on information not found in other handbooks is a good thing.	3.8

Instructor Rating Sheet Summary
Form B
Usefulness of "AS&R MANAGER"

Legend: 1 - Strongly agree
2 - Agree
3 - Not sure
4 - Disagree
5 - Strongly disagree

		Average Rating
1.	On-the-job training is too complex to be helped by the use of this handbook.	4.0
2.	The handbook would increase the G2 Air officer's capability to meet severe timeliness requirements.	2.6
3.	The task-by-task breakdown would be very helpful as a reference in doing the G2 Air's job.	2.0
4.	This handbook would be very useful to have in the field.	1.8
5.	The level of detail was small enough to be of real assistance in performing the G2 Air officer's job.	2.0
6.	This handbook would increase the efficiency with which the G2 Air officer does his job.	2.0
7.	The multiple indexing made it very easy to find a specific piece of information.	2.0
8.	The material covered can give new insight into the complexities of the G2 Air officer's job.	2.4
9.	This document would be useful in fulfilling the G2 Air officer's job.	2.0
10.	The material in the handbook does not lend itself to use in the formal course of instruction.	4.2
11.	Enough specific information was given that more examples were not needed.	2.4
12.	The absence of the usual military-handbook-style made the handbook a more effective job aid.	2.2

Instructor Rating Sheet Summary
Form B
Acceptance of "AS&R MANAGER"

Legend: 1 - Not at all
2 - Somewhat
3 - Moderately
4 - Very much so

		Average Rating
1.	I got a good appreciation of the things the handbook covered from the table of contents.	2.4
2.	I think that the handbook has given me a greater understanding of the G2 Air officer's responsibilities.	3.0
3.	I felt the indexing system was overly complex.	2.0
4.	I felt content needs to be presented in a more formal fashion.	1.6
5.	I think organization of the handbook was confusing; too many ways of saying the same thing.	1.8
6.	I felt that the coverage of the G2 Air's job was very thorough.	3.2
7.	I think this handbook would increase my effectiveness as a G2 Air officer.	4.0
8.	I don't think enough stress was placed on intelligence doctrine and material from other military handbooks.	2.2
9.	The informal style of writing held my interest.	3.4

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